Mini Fume Extractor

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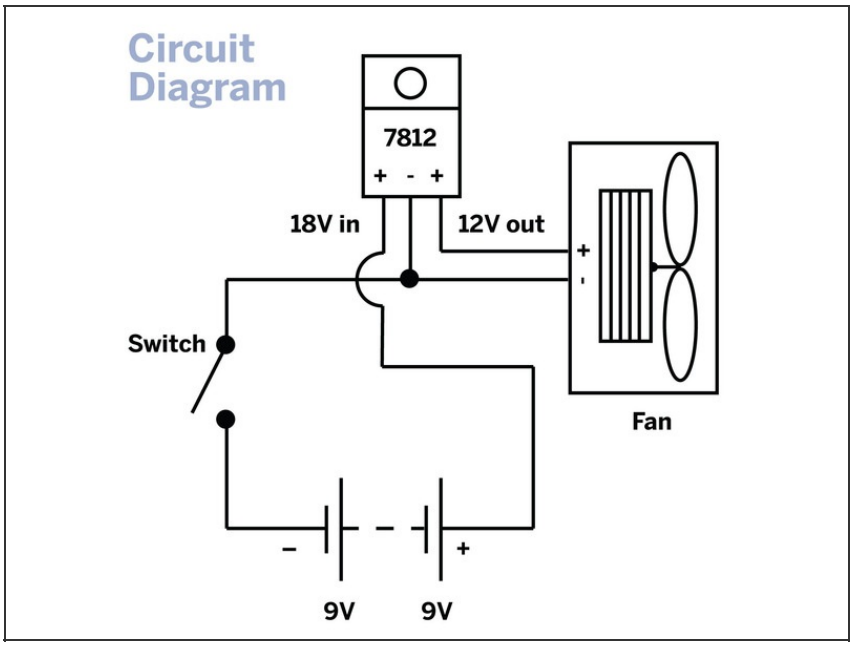
PARTS:

- Mini Fume Extractor Parts Bundle (1)
- Paint (1)
  optional

SUMMARY

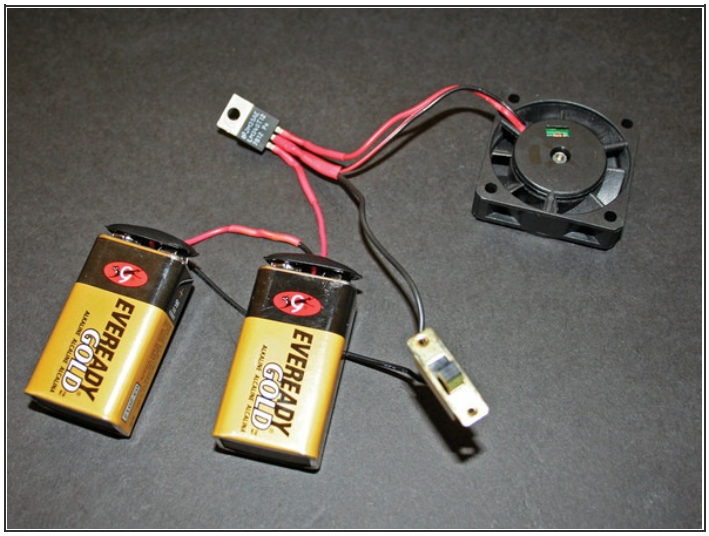
A fume extractor uses an activated carbon filter and fan to remove the smoke, and noxious fumes, created from soldering. The average price of a small hobby version is about $100, but this one made from the ubiquitous candy tin will run you more like $10. This mini fume extractor won't be as effective as a larger one, but it's definitely better than nothing, and extremely portable. Remember, always work in a well-ventilated area.

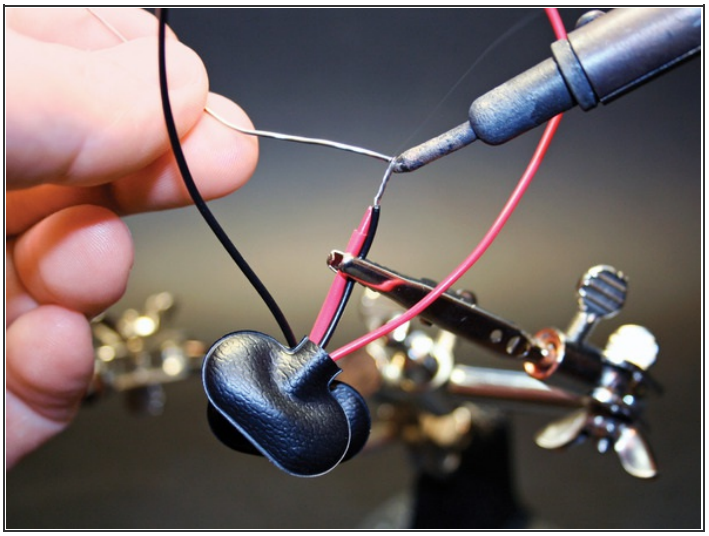
Step 1 — Build the circuit.



- I decided a quick mock-up might be a good idea, and I'm glad I did. At first, I thought that running the case fan off just one 9-volt battery would provide adequate power. In the end I decided that 12 volts "sucked" better, and in this case that's a good thing. The final circuit (at right) uses a simple switch, two 9-volt batteries, a 40mm case fan, and a 7812 voltage regulator. The 7812 takes voltage from the 9V batteries wired in series and steps the voltage down from 18V to 12V, which is what the fan requires.
- CAUTION: Wear safety glasses when drilling and cutting metal!

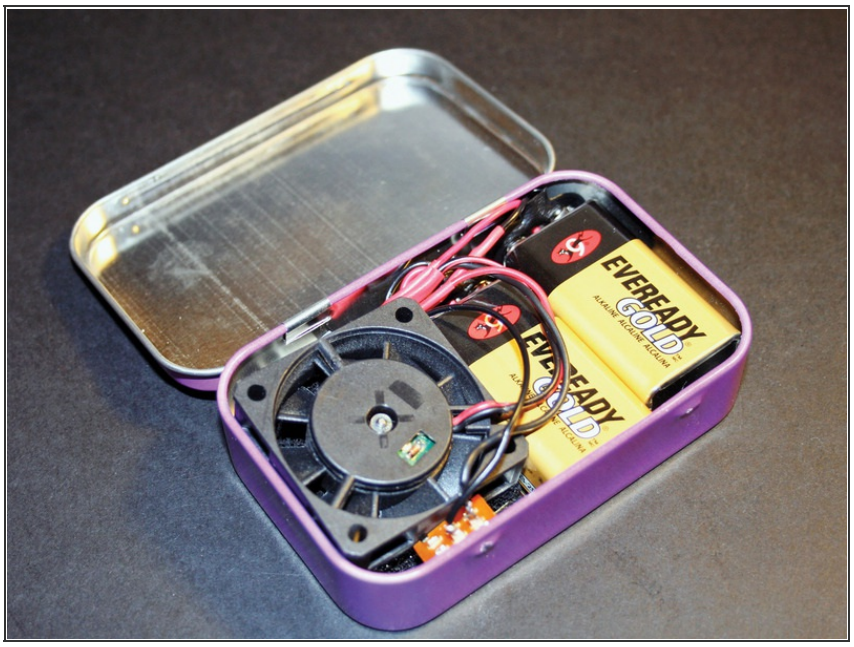
Step 2 — Solder the components.





- Notice the battery connectors; they're the flexible vinyl version, not the hard plastic type. This allows both batteries to fit in the case. The vinyl snaps are only minimally smaller, but it's enough to make the difference.
- This is a very simple circuit. Solder it according to the diagram, making sure to attach the component leads to the 7812 properly. Don't forget to use heat-shrink tubing on all connections; this is in a metal box ... and metal conducts electricity!

Step 3 — Make sure it all fits.



- It's a snug fit, but you should be able to stuff everything into the tin, packing the batteries side by side next to the fan.

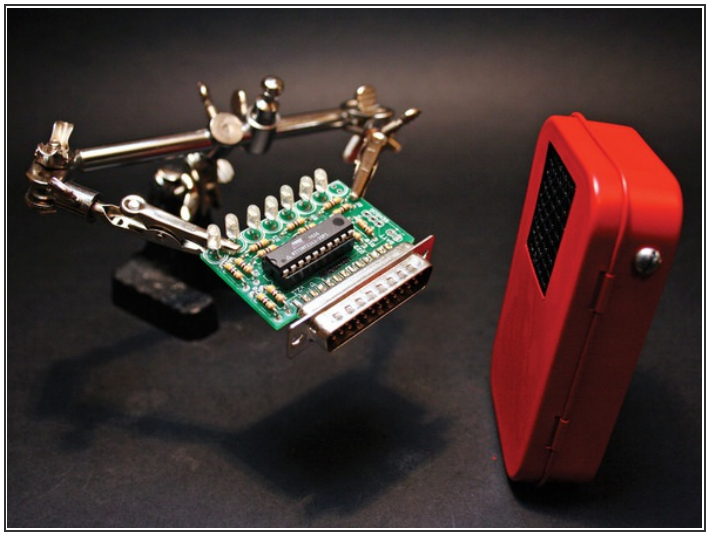
Step 4 — Cut and drill the holes.

- I used a marker and a paper template for the fan openings, making them 35mm square on each side. After you cut the first fan hole, close the box and use the template to align the second hole. You can just “eyeball” the placement. There’s room for error.
- Then I marked the opening for the switch and cut all openings with a Dremel tool and cutoff wheel.
- Next I marked and drilled 2 mounting holes for the switch screws and one for the regulator.

Step 5 — Paint and decorate.

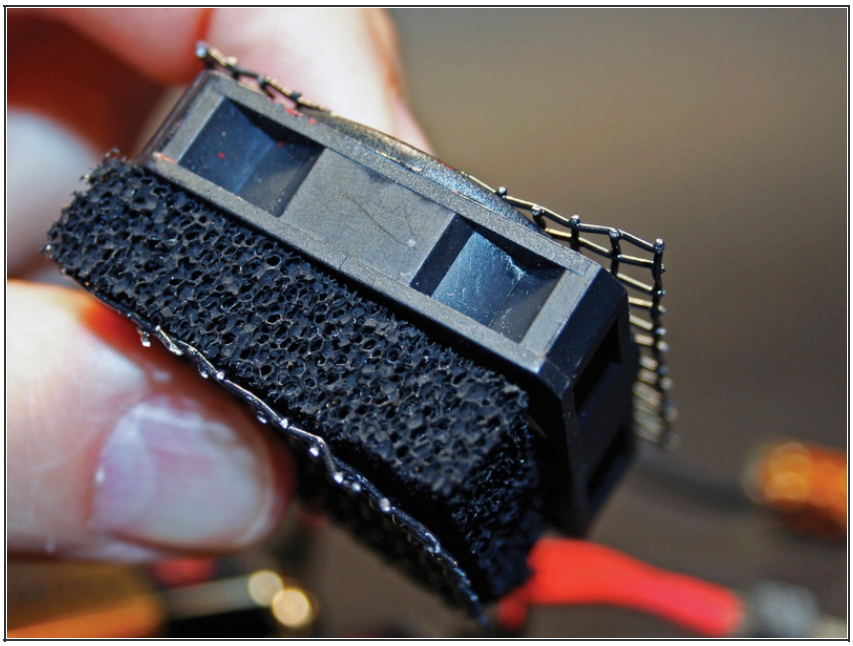
- I decided to paint the tin this time, unlike my plain RuntyBoost (makezine.com/go/runtyboost). I chose a nice red Krylon paint. I hot-glued a scrap piece of wood to the inside, so I could hold it while I spray-painted it. Two quick coats and I think it looks good. Spray paint can be fairly toxic and flammable, so paint outside and away from everything!

Step 6 — Attach the regulator and switch.



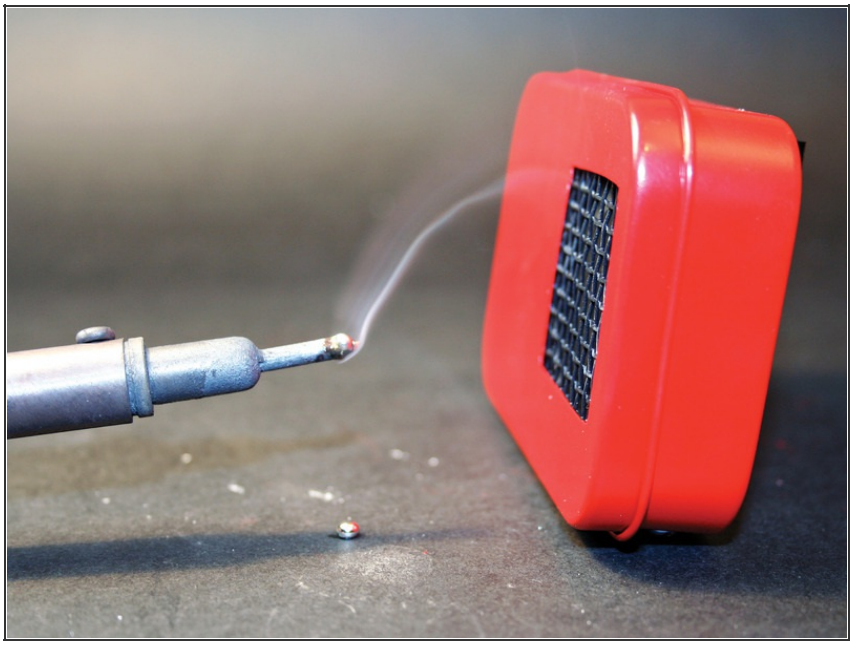
- First, screw in the 7812 using some washers and a screw to space it slightly away from the side of the tin. I used a #6-32 screw and one washer to keep it from the edge, but you can use anything that fits. The screws and washer will also act as a heat sink. Finally, screw in the switch.

Step 7 — Add the screens and filter.



- Take a look at the screen-filter-fan-screen sandwich. The screens are 50mm square and the filter is 40mm square. You can buy replacement filters for the commercial extractors at a reasonable price and cut them to size.
- Next, just hot-glue or epoxy the corners of the screens to the candy tin, and sandwich the filter and fan in between. Compression will ultimately hold it all together. You're done!

Step 8 — Test your extractor.



- I've run mine continuously for hours and have had no heat buildup from the 7812, and the fan is still running strong. It works quite well, and although it's no replacement for a large fume extractor, it will come in handy for small projects. Remember, follow all safety guidelines when soldering, and work in a well-ventilated room, even if you have a fume extractor.

This project originally appeared in MAKE Magazine Volume 19.

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